IN THE CLAIMS

1   1. [original] An apparatus comprising:

2   an IP wrapper circuit;

3   a packet switch;

4   one or more cherrypicker multiplexers; and

5   a local area network coupling said IP wrapper to said packet switch and

6   coupling said packet switch to said one or more cherrypicker multiplexers.

1   2. [currently amended] The apparatus of claim 1 wherein said cherrypicker

2   multiplexers and said packet switch cooperate to receive data indicating video programs to

3   be transmitted downstream to customers over DSL lines, cable television hybrid fiber coaxial

4   cable networks or satellite downlinks and to receive MPEG data encapsulated in IP packets

5   which are encapsulated in local area network packets from said IP wrapper circuit and to pick

6   out only the MPEG packets containing data encoding the video programs which are to be

7   transmitted and assemble said MPEG packets into MPEG transport streams, and wherein

8   said cherrypicker multiplexers further comprise circuitry to adjust the bandwidth of the MPEG

9   transport streams so generated to match the available bandwidth to transport <u>or</u> ~~and/or~~

10   process the data of said video program(s).

11

1   3. [currently amended] An apparatus comprising:

2   one or more video servers that output MPEG transport streams;

3   one or more satellite feeds that output MPEG transport streams;

4   an IP wrapper circuit coupled to said one or more video servers and said one

5   or more satellite feeds;

6   a packet switch;

7   one or more cherrypicker multiplexers; and

8   a local area network coupling said IP wrapper <u>circuit</u> to said packet switch and

9   coupling said packet switch to said one or more cherrypicker multiplexers;

10   means for receiving upstream requests for video-on-demand programs and

11   sending data to said cherrypicker multiplexers which identify the requested programs;

12   and

13   means for sending data to said one or more video servers or ~~and/or~~ satellite

14   feeds or both said video servers or satellite feeds identifying which video program

15   data should be sent to said cherrypicker multiplexers through said IP wrapper circuit,

16   said local area network and said packet switch for assembly into MPEG transport

17   streams for transmission to customers which made said upstream requests.

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1   4. [currently amended] An apparatus comprising:

2   one or more video servers that output MPEG transport streams;

3   one or more satellite feeds that output MPEG transport streams;

4   one or more web servers;

5   any one or more other types of servers on which applications programs may

6   be run remotely from customer sites;

7   an IP wrapper circuit coupled to said one or more video servers and said one

8   or more satellite feeds;

9   a packet switch coupled to said one or more web servers and said any one or

10   more other types of servers;

11   one or more cherrypicker multiplexers;

12   a local area network coupling said IP wrapper to said packet switch and

13   coupling said packet switch to said one or more cherrypicker multiplexers; and

14   upstream channel means for receiving upstream requests from customers for

15   video programs and requests or commands to obtain data from the internet via said

16   web server or execute application programs on said other servers, and for identifying

17   the requested video programs to the appropriate one or more of said video servers or

18   satellite feeds or both and to send said request for data and commands to one or

19   more the appropriate web server or any other types of server which can supply said

20   requested data or execute said command;

21   and wherein said IP wrapper circuit and said packet switch cooperate to

22   packetize said requested video program data appropriately and route said packetized

23   video data and other requested data output by said one or more web servers and

24   said any one or more other types of servers to the appropriate one or more means of

25   said cherrypicker multiplexers for transmission to the one or more customers who

26   requested said data.

5. [original] The apparatus of claim 4 wherein said cherrypicker multiplexers further

comprise means for adjusting the bandwidth of data to be sent to customers to lesser

bandwidths if necessary.

1   6. [currently amended]   An apparatus comprising:

2   an IP wrapper circuit for receiving MPEG transport streams on one or more

3   inputs, each said MPEG transport stream comprised of a plurality of MPEG packets,

4   each MPEG packet having a program identification code (hereafter a PID) and

5   mapping said PIDs the program identification codes (hereafter PID) and input number

6   for each MPEG packet in each said transport stream into an IP packet header

7   multicast destination address and encapsulating one or more of said MPEG packets

8   having the same PID and input number into an IP packet and encapsulating each IP

9   packet into a LAN packet having an LAN packet destination address which is a

10   multicast address but which is unique to the PID and input number of the MPEG

11   packets enclosed therein;

12   a local area network coupled to said IP wrapper circuit;

13   a packet switch coupled to said IP wrapper circuit via said local area network;

14   one or more cherrypicker multiplexers coupled to said packet switch via said

15   local area network, each functioning to receive data defining which programs have

16   been requested by one or more customers or which is to be transmitted regardless of

17   requests for it and generating and transmitting to said packet switch one or more

18   packets identifying by LAN packet destination address the LAN packets said packet

19   switch is to route to said cherrypicker multiplexer, and for receiving from said packet

20   switch the requested LAN packets encapsulating MPEG data and assembling MPEG

21   transport streams that are to be sent to said customers containing data encoding the

22   programs which have been requested or which are to be transmitted regardless of

23   request, and encapsulating MPEG packets from said transport streams into UDP/IP

24   or TCP/IP packets.

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1   7. [original] The apparatus of claim 6 further comprising an IP dewrapper circuit

2   coupled to said cherrypicker multiplexers through said packet switch and said local area

3   network and functioning to receive LAN packets encapsulating UDP/IP or TCP/IP packets

4   which encapsulate at least MPEG packet data and which are addressed to said IP

5   dewrapper circuit, said IP dewrapper circuit functioning to strip off the LAN packet header

6   and UDP/IP or TCP/IP packet header and output a pure MPEG transport stream, and

7   wherein said cherrypicker multiplexers function to encapsulate the UDP/IP or TCP/IP packets

8   they generate in LAN packets addressed to said IP dewrapper circuit and transmit them over

9   said local area network to said packet switch.

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1   8. [currently amended] The apparatus of claim 6 further comprising dedicated data

2   paths from each said cherrypicker multiplexer to one or more DSL modems or cable modems

3   or satellite uplink facilities.

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1   9. [currently amended] The apparatus of claim 6 further comprising a second local or

2   wide area network of a different type than the type of local area network coupled to said

3   packet switch, said second local or wide area network, ~~such as an ATM cell network,~~ coupling

4   said cherrypicker multiplexers to one or more DSL modems or cable modems or satellite

5   uplink facilities.

6

1   10. [original] The apparatus of claim 6 further comprising means for receiving

2   upstream requests for video-on-demand programs or other TCP/IP packetized data from the

3   internet or other sources and for transmitting those requests to said cherrypicker multiplexers.

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1   11. [original] The apparatus of claim 10 wherein said cherrypicker multiplexers

2   convert said requests to particular PIDs and input number, and generate and send to said

3   packet switch LAN packets identifying the particular LAN packets by LAN destination address

4   which will carry the data requested in the upstream request.

5

1   12. [original] The apparatus of claim 11 wherein said packet switch further functions

2   to receive said LAN packets identifying LAN packets to be routed to said cherrypicker

3   multiplexers and generates and sends messages to the appropriate source of the requested

4   data requesting that the requested data be sent to said packet switch.

1   13. The apparatus of claim 6 further comprising a web server coupled to the internet

2   and a local area network connection between said web server and said packet switch.

1   14. [currently amended] The apparatus of claim 6 further comprising a wide ~~are~~ area

2   network data path between said packet switch and one or more other cable system

3   headends or DSL central offices or satellite uplink facilities such that requested data may be

4   received from said one or more other cable system headends or DSL central offices or

5   satellite uplink facilities.

1   15. [currently amended] An apparatus comprising:

2   one or more video servers ~~and/or~~ or satellite uplink/downlink circuitry or both

3   that output MPEG transport streams encoding one or more video programs, each

4   MPEG transport stream comprised of a plurality of MPEG packets each having a

5   program identification code (hereafter PID);

6   an IP wrapper circuit for receiving MPEG transport streams on one or more

7   inputs coupled to said one or more video servers ~~and/or~~ or satellite receivers or both

8   said video servers and satellite receivers, and mapping said PIDs ~~the program~~

9   ~~identification codes (hereafter PID)~~ and input number for each MPEG packet in each

10   said transport stream into an IP packet header multicast destination address and

11   encapsulating one or more of said MPEG packets having the same PID and input

12   number into an IP packet and encapsulating each IP packet into a LAN packet

13   having an LAN packet destination address which is a multicast address but which is

14   unique to the PID and input number of the MPEG packets enclosed therein;

15   a local area network coupled to said IP wrapper circuit;

16   a packet switch coupled to said IP wrapper circuit via said local area network;

17   one or more cherrypicker multiplexers coupled to said packet switch via said

18   local area network, each functioning to receive data defining which programs have

19   been requested by one or more customers or which is to be transmitted regardless of

20   requests for it and generating and transmitting to said packet switch one or more

21   packets identifying by LAN packet destination address the LAN packets said packet

22   switch is to route to said cherrypicker multiplexer, and for receiving from said packet

23   switch the requested LAN packets encapsulating MPEG data and assembling MPEG

24   transport streams that are to be sent to said customers containing data encoding the

25   programs which have been requested or which are to be transmitted regardless of

26   request, and encapsulating MPEG packets from said transport streams into UDP/IP

27   or TCP/IP packets addressed either to a ~~the~~ host <u>computer</u> and <u>a</u> process on said

28   host <u>computer</u> at a customer site to which <u>said</u> ~~the~~ data is to be sent or <u>addressed</u> to

29   an IP dewrapper circuit coupled by said local area network to said packet switch and

30   which does not form part of the invention of this claim;

31   means for receiving upstream requests for video-on-demand programs or

32   other TCP/IP packetized data from the internet or other sources and for transmitting

33   those requests to said cherrypicker multiplexers;

34   and wherein said cherrypicker multiplexers convert said upstream requests to

35   particular PIDs and input numbers, and generate and send to said packet switch LAN

36   packets or other messages identifying the particular LAN packets to be routed to

37   each said cherrypicker multiplexer by LAN destination address, said LAN packet to be

38   routed to said cherrypicker multiplexers being ones which will carry the video

39   programs and other data requested in the upstream requests;

40   and wherein said packet switch functions to receive said LAN packets or

41   messages identifying the requested LAN packets and generates and sends LAN

42   packets or other messages to said one or more video servers and/or satellite

43   uplink/downlink circuitry requesting that the requested data be transmitted to said IP

44   wrapper circuit.

1   16. [original] The apparatus of claim 15 further comprising an IP dewrapper circuit

2   coupled to said packet swtich via said local area network and functioning to receive LAN

3   packets encapsulating UDP/IP or TCP/IP packets encapsulating MPEG data and strip off

4   said LAN packet header and said UDP/IP packet header and output a pure MPEG transport

5   stream, and wherein said cherrypicker multiplexers address said UDP/IP or TCP/IP packets to

6   said IP dewrapper circuit and further function to encapsulate said UDP/IP or TCP/IP packets

7   into LAN packets addressed to said IP dewrapper circuit.

1   17. [currently amended] An apparatus comprising:

2   one or more video servers and/or satellite uplink/downlink circuitry that output

3   MPEG transport streams encoding one or more video programs, each MPEG

4   transport stream comprised of a plurality of MPEG packets each having a program

5   identification code (hereafter PID);

6   one or more web servers coupled to the internet;

7   an IP wrapper circuit for receiving MPEG transport streams on one or more

8   inputs coupled to said one or more video servers and/or satellite receivers, and

9   mapping said PIDs the program identification codes (hereafter PID) and input number

10 for each MPEG packet in each said transport stream into an IP packet header

11 multicast destination address and encapsulating one or more of said MPEG packets

12 having the same PID and input number into an IP packet and encapsulating each IP

13 packet into a LAN packet having an LAN packet destination address which is a

14 multicast address but which is unique to the PID and input number of the MPEG

15 packets enclosed therein;

16   a local area network coupled to said IP wrapper circuit and said one or more

17 web servers;

18   a packet switch coupled to said IP wrapper circuit and said one or more web

19 servers via said local area network;

20   one or more cherrypicker multiplexers coupled to said packet switch via said

21 local area network, each functioning to receive data defining which programs have

22 been requested by one or more customers or which is to be transmitted regardless of

23 requests for it and generating and transmitting to said packet switch one or more

24 packets identifying by LAN packet destination address the LAN packets said packet

25 switch is to route to said cherrypicker multiplexer, and for receiving from said packet

26 switch the requested LAN packets encapsulating MPEG data and assembling MPEG

27 transport streams that are to be sent to said customers containing data encoding the

28   programs which have been requested or which are to be transmitted regardless of

29   request, and encapsulating MPEG packets from said transport streams into UDP/IP

30   or TCP/IP packets addressed either to a the host computer and a process on said

31   host computer at a customer site to which said the data is to be sent or addressed to

32   an IP dewrapper circuit coupled by said local area network to said packet switch and

33   which does not form part of the invention of this claim;

34   means for receiving upstream requests for video-on-demand programs or

35   other TCP/IP packetized data from the internet or other sources and for transmitting

36   those requests to said cherrypicker multiplexers;

37   and wherein said cherrypicker multiplexers convert said upstream requests to

38   particular PIDs and input numbers or any format suitable for communicating to the

39   source of the requested data what data was requested, and generate and send to

40   said packet switch LAN packets or other messages identifying the particular TCP/IP

41   data encapsulated in LAN packets and/or LAN packets encapsulating video program

42   data to be routed to each said cherrypicker multiplexer, said LAN packets being

43   identified by LAN destination address, said LAN packet to be routed to said

44   cherrypicker multiplexers being ones which will carry the video programs and/or other

45   TCP/IP packetized data requested in said upstream requests;

46   and wherein said packet switch functions to receive said LAN packets or

47   messages identifying the requested LAN packets and generates and sends LAN

48   packets or other messages to said one or more video servers and/or satellite

49   uplink/downlink circuitry requesting that the requested video data be transmitted to

50   said IP wrapper circuit and that the requested TCP/IP data be transmitted to said

51   packet switch, said packet switch functioning to receive LAN packets encapsulating

52   the requested video and/or TCP/IP packetized data and route said LAN packets to

53   the cherrypicker multiplexer that requested said data.

1   18. [original] The apparatus of claim 17 further comprising an IP dewrapper circuit

2   coupled to said packet swtich via said local area network and functioning to receive LAN

3   packets encapsulating UDP/IP or TCP/IP packets encapsulating MPEG data and strip off

4   said LAN packet header and said UDP/IP packet header and output a pure MPEG transport

5   stream, and wherein said cherrypicker multiplexers address said UDP/IP or TCP/IP packets to

6   said IP dewrapper circuit and further function to encapsulate said UDP/IP or TCP/IP packets

7   into LAN packets addressed to said IP dewrapper circuit.

1   19. [currently amended] A process for supplying video data to consumers,

2   comprising the steps of:

3   (1) receiving one or more MPEG transport streams containing data encoding

4   video programs to be transmitted to one or more consumers, each MPEG transport

5   stream comprised of a plurality of MPEG packets each having a program identification

6   code (hereafter PID);;

7   (2) encapsulating one or more MPEG packets having the same PID program

8   identification code and input multiplex number (together hereafter referred to as a

9   PID) from said transport streams in the payload portion of an internet protocol packet

10   (hereafter referred to as an IP packet) and mapping the PID of the encapsulated

11   MPEG packets into an IP multicast address used as the destination address of said

12   IP packet;

13   (3) encapsulating each said IP packet in a local area network packet and

14   mapping said IP packet multicast destination address into a multicast destination

15   address for the local area network destination address which is unique for each PID;

16   (4) transmitting said local area network packets so generated over said local

17   area network to a packet switch;

18   (5) receiving in said packet switch from each of said one or more cherrypicker

19   multiplexers one or more local area network packets containing data indicating the

20 video program data to be routed to said cherrypicker multiplexer and routing incoming
21 local area network packets containing data specified by a cherrypicker multiplexer as
22 desired data to said cherrypicker multiplexer;

23 (6) in each cherrypicker multiplexer, sorting incoming MPEG packets by their
24 PIDs into one or more MPEG transport streams to be transmitted to one or more
25 customers and packetizing each MPEG transport stream into TCP/IP or UDP/IP
26 packets.

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1 20. [currently amended] The process of claim 19 wherein step (5) includes at least
2 receiving at said packet switch from each cherrypicker multiplexer one or more local area
3 network packets containing data indicating video video-on-deman program data which has
4 been requested by one or more customers being served by said cherrypicker multiplexer, and
5 wherein step (6) further comprises packetizing MPEG packets from each MPEG transport
6 stream encoding a video-on-demand program which has been requested by a customer in
7 TCP/IP or UDP/IP packets addressed to a the host computer and a particular process
8 executing on said that host computer which requested said video-on-demand program data.

1 21. [original] The process of claim 19 wherein step (5) includes at least receiving from
2 each cherrypicker multiplexer one or more local area network packets containing data
3 indicating video program data which has been requested by one or more customers being
4 served by said cherrypicker multiplexer, and wherein step (6) further comprises packetizing
5 MPEG packets from each MPEG transport stream encoding a video-on-demand program
6 which has been requested by a customer in TCP/IP or UDP/IP packets addressed to an
7 MPEG transport stream generating process in one of one or more IP dewrapper circuits which
8 transmits MPEG transport streams to customers, the particular IP dewrapper circuit to which
9 said TCP/IP or UDP/IP packets encoding a particular video-on-demand program are
10 addressed being the one which transmits an MPEG transport stream to a customer which

11   requested said video-on-demand program, and further comprising the step of encapsulating

12   said TCP/IP or UDP/IP packets in a local area network packet addressed to said IP

13   dewrapper circuit.

1   22. [original] The process of claim 21 further comprising stripping off the local area

2   network packet headers and TCP/IP or UDP/IP packet headers from said local area network

3   packets encapsulating the MPEG packets which encode a particular video-on-demand

4   program and transmitting said MPEG packets to the customer which requested said video-on-

5   demand program as an MPEG transport stream which is modulated in any way and

6   multiplexed, if necessary, in any way onto any suitable downstream logical and physical

7   channel.

1   23. [currently amended] The process of claim 19 wherein step (6) further comprises

2   the steps of:

3   receiving data indicating the available bandwidth for MPEG packets encoding

4   particular video programs;

5   decompressing at least partially the MPEG packets received in each

6   cherrypicker multiplexer;

7   recompressing the video data from MPEG packets encoding each particular

8   video program to the available bandwidth specified for that particular video program;

9   and

10   repacketizing the video data into MPEG packets in an MPEG transport

11   stream.

1   24. [original] The process of claim 20 wherein step (6) further comprises the steps of:

2   receiving data indicating the available bandwidth for MPEG packet encoding

3   particular video programs;

4   decompressing at least partially the MPEG packets received in each

5   cherrypicker multiplexer;

6   recompressing the video data from MPEG packets encoding each particular

7   video program to the available bandwidth specified for that particular video program;

8   and

9   repacketizing the video data into MPEG packets in an MPEG transport

10   stream.

1   25. [original] The process of claim 21 wherein step (6) further comprises the steps of:

2   receiving data indicating the available bandwidth for MPEG packet encoding

3   particular video programs;

4   decompressing at least partially the MPEG packets received in each

5   cherrypicker multiplexer;

6   recompressing the video data from MPEG packets encoding each particular

7   video program to the available bandwidth specified for that particular video program;

8   and

9   repacketizing the video data into MPEG packets in an MPEG transport

10   stream.

1   26. [currently amended] The process of claim 22 ~~24~~ wherein step (6) further

2   comprises the steps of:

3   receiving data indicating the available bandwidth for MPEG packet encoding

4   particular video programs;

5   decompressing at least partially the MPEG packets received in each

6   cherrypicker multiplexer;

7   recompressing the video data from MPEG packets encoding each particular

8   video program to the available bandwidth specified for that particular video program;

9   and

10   repacketizing the video data into MPEG packets in an MPEG transport

11   stream.

1   27. [currently amended] A process for supplying video data to consumers,

2   comprising the steps of:

3   (1) receiving one or more MPEG transport streams containing data encoding

4   video programs to be transmitted to one or more consumers, each MPEG transport

5   stream comprised of a plurality of MPEG packets each having a program identification

6   code (hereafter PID);

7   (2) encapsulating one or more MPEG packets having the same PID program

8   identification code and input multiplex number (together hereafter referred to as a

9   combined PID) from said transport streams in the payload portion of an internet

10   protocol packet (hereafter referred to as an IP packet) and mapping the combined

11   PID of the encapsulated MPEG packets into an IP multicast address used as the

12   destination address of said IP packet;

13   (3) encapsulating each said IP packet in a local area network packet and

14   mapping said IP packet multicast destination address into a multicast destination

15   address for the local area network destination address which is unique for each

16   combined PID;

17   (4) transmitting said local area network packets so generated over said local

18   area network to a packet switch;

19   (5) receiving in said packet switch from each of said one or more cherrypicker

20   multiplexers one or more local area network packets containing data indicating the

21   video-on-demand program data which has been requested by one or more customers

22   and which is to be routed to said cherrypicker multiplexer and routing incoming local

23   area network packets containing data specified by a cherrypicker multiplexer as

24 desired data to said cherrypicker multiplexer;

25 (6) in each cherrypicker multiplexer, sorting incoming MPEG packets by their

26 combined PIDs into one or more MPEG transport streams to be transmitted to one or

27 more customers and further comprising the steps of packetizing MPEG packets from

28 each MPEG transport stream encoding a video-on-demand program which has been

29 requested by a customer in TCP/IP or UDP/IP packets addressed to an MPEG

30 transport stream generating process in one of one or more IP dewrapper circuits

31 which transmit MPEG transport streams to customers, the particular IP dewrapper

32 circuit to which said TCP/IP or UDP/IP packets encoding a particular video-on-

33 demand program are addressed being the one which transmits an MPEG transport

34 stream to a customer which requested said video-on-demand program, and further

35 comprising the step of encapsulating said TCP/IP or UDP/IP packets in a local area

36 network packet addressed to said IP dewrapper circuit;

37 (7) stripping off the local area network packet headers and TCP/IP or UDP/IP

38 packet headers from said local area network packets encapsulating the MPEG

39 packets which encode a particular video-on-demand program and transmitting said

40 MPEG packets to the customer which requested said video-on-demand program as

41 an MPEG transport stream which is modulated in any way and multiplexed, if

42 necessary, in any way onto any suitable downstream logical and physical channel;

43 (8) and wherein step (6) further comprises the steps of:

44   receiving data indicating the available bandwidth for MPEG packet

45 encoding particular video programs;

46   decompressing at least partially the MPEG packets received in each

47 cherrypicker multiplexer;·

48   recompressing the video data from MPEG packets encoding each

49 particular video program to the available bandwidth specified for that

50 particular video program; and

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51   repacketizing the video data into MPEG packets in an MPEG

52   transport stream.

1   28. [currently amended] (First Embodiment) A process carried out at a headend

2   having video servers coupled thereto for supplying video data from video servers coupled to

3   said headend and iData and video data to consumers, wherein iData is defined as data from

4   one or more web or other servers coupled to said headend other than said video servers

5   coupled to said headend, comprising the steps of:

6   (1) in a modem coupled to one or more customers by any upstream and

7   downstream data paths, receiving upstream video-on-demand requests and requests

8   for iData and iData command packets, packetizing said requests and commands into

9   local area network packets (hereafter LAN packets) and transmitting LAN packets

10   containing requests for iData and other commands via a local area network to an

11   appropriate server entity which can supply the requested iData or execute the iData

12   command, and transmitting LAN packets containing video-on-demand requests to

13   one or more cherrypicker multiplexers;

14   (2) simultaneously or at different times, receiving in an IP dewrapper circuit

15   one or more MPEG transport streams containing data encoding video programs to be

16   transmitted to one or more consumers, each MPEG transport stream comprised of a

17   plurality of MPEG packets each having a program identification code (hereafter PID);;

18   (3) receiving or generating in a web server connected to the internet or any

19   other type of server including an application server one or more TCP/IP or UDP/IP

20   packets of iData and encapsulating them in local area network packets addressed to

21   a modem which will be used to transmit the TCP/IP or UDP/IP packets encapsulated

22   in said LAN packets downstream and transmitting said LAN packets to a packet

23   switch;

24   (4) in said packet switch, routing said LAN packets containing iData to said

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25   modem;

26   (5) in said modem, receiving said LAN packets containing iData and

27   transmitting them downstream to the customer which requested said iData;

28   (6) in an IP wrapper circuit, encapsulating one or more MPEG packets of

29   video program data having the same PID ~~program identification code~~ and input

30   multiplex number (together hereafter referred to as a combined PID) from said

31   transport streams in the payload portion of an internet protocol packet (hereafter

32   referred to as an IP packet) and mapping ~~the~~ said combined PID of the encapsulated

33   MPEG packets into an IP multicast address used as the destination address of said

34   IP packet;

35   (7) in said IP wrapper circuit encapsulating each said IP packet in a LAN

36   packet and mapping said IP packet multicast destination address into a multicast

37   destination address for the local area network destination address which is unique for

38   each said combined PID;

39   (8) transmitting said LAN packets so generated containing video program

40   data over said local area network to a packet switch;

41   (9) receiving in said packet switch from each of said one or more cherrypicker

42   multiplexers one or more LAN packets containing data indicating the video program

43   data to be routed to said cherrypicker multiplexer and routing incoming LAN packets

44   containing data specified by a cherrypicker multiplexer as desired data to said

45   cherrypicker multiplexer;

46   (10) in each cherrypicker multiplexer, receiving data indicating video-on-

47   demand requests for video programs and transmitting data to said packet switch

48   indicating which LAN packets containing video program data to route to said

49   cherrypicker multiplexer, and sorting incoming MPEG packets by their combined PIDs

50   into one or more MPEG transport streams to be transmitted to one or more customers

51   and performing the following steps:

52   decompressing at least partially the MPEG packets received in each

53   cherrypicker multiplexer;

54   recompressing the video data from MPEG packets encoding each

55   particular video program to the available bandwidth specified for that

56   particular video program; and

57   repacketizing the video data into MPEG packets and packetizing said

58   MPEG packets in TCP/IP or UDP/IP packets.

1   29. [currently amended] The process of claim 28 wherein said TCP/IP or UDP/IP

2   packets generated by said cherrypicker multiplexer are addressed to the a host computer

3   and process executing on said host computer at a customer location to which the data

4   encapsulated in said TCP/IP or UDP/IP packets is to be sent, and further comprising the step

5   of transmitting said TCP/IP or UDP/IP packets to said host computer and process executing

6   on said host over any downstream logical channel which has TCP/IP or UDP/IP connectivity

7   all the way to said host computer and process running on said host computer.

1   30. [currently amended] The process of claim 28 wherein said TCP/IP or UDP/IP

2   packets generated by said cherrypicker multiplexer are addressed to an IP dewrapper circuit,

3   and further comprising the steps of:

4   encapsulating said TCP/IP or UDP/IP packets in local area network packets

5   addressed to said IP dewrapper circuit;

6   in said IP dewrapper circuit, receiving said LAN packets and stripping off the

7   LAN packet headers and TCP/IP or UDP/IP packet headers and assembling the

8   encapsulated MPEG packets into MPEG transport streams;

9   transmitting said MPEG transport streams to specific customers over logical

10   channels on any suitable downstream medium; and

11   if said MPEG video data contains video-on-demand video program data for

12   which ~~the~~ a host computer and a process executing on said host computer at the

13   customer location which requested the video program does not have data regarding

14   which logical channel said requested video program data will be transmitted on

15   and/or what PID the video program data will have, transmitting a downstream

16   message to said host computer and said process executing on said host computer

17   which requested said video program data indicating which logical channel said video

18   program will be transmitted on and, if necessary, what PID or PIDs said requested

19   video program data will have.

1   31. [currently amended] ~~(Second Embodiment)~~ A process carried out at a headend having

2   video servers coupled thereto, said process for supplying video data to consumers,

3   comprising the steps of:

4   (1) in a modem coupled to one or more customers by any upstream and

5   downstream data paths, receiving upstream video-on-demand requests and requests

6   for iDatas, wherein iData is defined as data from one or more web or other servers

7   coupled to said headend other than said video servers coupled to said headend,

8   packetizing said requests into local area network packets (hereafter LAN packets)

9   and transmitting LAN packets containing each request for iData via a local area

10   network to an appropriate server entity which can supply the requested iData along

11   with message data indicating to which of one or more cherrypicker multiplexers to

12   transmit the requested iData, and transmitting LAN packets containing video-on-

13   demand requests to one or more cherrypicker multiplexers;

14   (2) receiving in an IP dewrapper circuit one or more MPEG transport streams

15   containing data encoding video programs to be transmitted to one or more

16   consumers, each MPEG transport stream comprised of a plurality of MPEG packets

17   each having a program identification code (hereafter PID);

18   (3) receiving or generating in a web server connected to the internet or any

19 other type of server including an application server one or more TCP/IP or UDP/IP

20 packets of iData and encapsulating them in ~~local-area~~ network packets (hereafter

21 network ~~LAN~~ packets) addressed to one or more cherrypicker multiplexers at least

22 one of which will be used to transmit said iData packets downstream in <u>an</u> ~~and~~ MPEG

23 transport stream, and transmitting said <u>network</u> ~~LAN~~ packets to a packet switch;

24 (4) in said packet switch, routing said <u>network</u> ~~LAN~~ packets containing iData

25 to a cherrypicker multiplexer;

26 (5) in each said cherrypicker multiplexer, receiving said <u>network</u> ~~LAN~~ packets

27 containing iData and <u>recovering iData stored therein</u> ~~stripping off said LAN packets~~

28 ~~header and said TCP/IP or UDP/IP packet header and encapsulating the enclosed~~

29 ~~iData in a TCP/IP or UDP/IP packet~~;

30 (6) in an IP wrapper circuit, encapsulating one or more MPEG packets of

31 video program data having the same <u>PID</u> ~~program identification code~~ and input

32 multiplex number (together hereafter referred to as a <u>combined</u> PID) from said

33 transport streams in the payload portion of an internet protocol packet (hereafter

34 referred to as an IP packet) and mapping the <u>combined</u> PID of the encapsulated

35 MPEG packets into an IP multicast address used as <u>a</u> ~~the~~ destination address of said

36 IP packet;

37 (7) in said IP wrapper circuit, encapsulating each said IP packet in a LAN

38 packet and mapping said IP packet multicast destination address into a ~~multicast~~

39 ~~destination address for the~~ local area network destination address which is unique for

40 each <u>said combined</u> PID <u>and placing said local area network destinaton address in</u>

41 <u>said LAN packet</u>;

42 (8) transmitting said LAN packets so generated containing video program

43 data over said local area network to a packet switch;

44 (9) receiving in said packet switch from each of said one or more cherrypicker

45 multiplexers one or more LAN packets containing data indicating <u>which LAN packets</u>

46   containing said ~~the~~ video program data or iData are to be routed to said cherrypicker

47   multiplexer and routing incoming LAN packets containing the specified data ~~specified~~

48   ~~by a cherrypicker multiplexer as desired data~~ to said cherrypicker multiplexer;

49   (10) in each cherrypicker multiplexer, receiving VOD request data indicating

50   video-on-demand requests for video programs made by customers and transmitting

51   LAN packets containing said VOD request data to said packet switch indicating which

52   LAN packets containing video-on-demand program data to route to said cherrypicker

53   multiplexer, and sorting incoming LAN packets arriving from said packet switch and

54   containing MPEG packets containing video data by a PID in each MPEG packet or

55   by local area network station addresses in said incoming LAN packets, each of said

56   local are network station addresses being mapped to a PID in an MPEG packet

57   encapsulated in said LAN packet , said sorting resulting in one or more pluralities of

58   LAN packets containing MPEG packet data from which ~~their PIDs into~~ one or more

59   MPEG transport streams to be transmitted to one or more customers can be created,

60   and performing the following steps:

61   recovering MPEG packets encapsulated in said LAN packets and

62   decompressing at least partially the MPEG packets received in each

63   cherrypicker multiplexer;

64   recompressing the data from MPEG packets encoding each particular

65   video program and iData to the available bandwidth specified for that

66   particular video program or iData; and

67   repacketizing the video data and iData into MPEG packets and

68   packetizing said MPEG packets in TCP/IP or UDP/IP packets.

1   32. [currently amended] The process of claim 31 wherein said TCP/IP or UDP/IP

2   packets generated by each said cherrypicker multiplexer are addressed to ~~the~~ a host

3   computer and process executing on said host computer at a customer location to which the

4 video data or iData encapsulated in said TCP/IP or UDP/IP packets is to be sent, and further

5 comprising the step of transmitting said TCP/IP or UDP/IP packets to said host computer and

6 process running on said host computer over any downstream logical channel which has

7 TCP/IP or UDP/IP connectivity all the way to said host computer and process running on said

8 host computer.

1 33. [currently amended] The process of claim 31 wherein said TCP/IP or UDP/IP

2 packets generated by said cherrypicker multiplexer are addressed to an IP dewrapper circuit,

3 and further comprising the steps of:

4 encapsulating said TCP/IP or UDP/IP packets in LAN packets addressed to

5 said IP dewrapper circuit;

6 in said IP dewrapper circuit, receiving said LAN packets and stripping off the

7 LAN packet headers and TCP/IP or UDP/IP packet headers and assembling the

8 encapsulated MPEG packets into MPEG transport streams;

9 transmitting said MPEG transport streams to specific customers over logical

10 channels on any suitable downstream medium; and

11 if said MPEG video data contains video-on-demand video program data for

12 which the host and process at the customer location which requested the video

13 program does not have data regarding which logical channel said requested video

14 program data will be transmitted on and/or what PID the video program data will

15 have, transmitting a downstream message to said a host computer and a process

16 running on said host computer which requested said video program data indicating

17 which logical channel said video program will be transmitted on and, if necessary,

18 what PID or PIDs said requested video program data will have.

1 34. [currently amended] (Third embodiment) A process carried out at a headend having

2 video servers coupled thereto, said process for supplying video data to consumers,

3   comprising the steps for:

4   (1) in a modem coupled to one or more customers by any upstream, receiving

5   upstream video-on-demand requests and requests for iData and iData commandss,

6   wherein iData is defined as data from one or more web or other servers other than

7   said video servers coupled to said headend, and transmitting them to a control

8   computer;

9   (2) in said control computer transmitting one or more messages to one or

10   more video servers, web servers and/or application servers that can supply the

11   requested data requesting that they supply the requested data and assigning logical

12   channels on which the requested iData and video program data is to be transmitted

13   to the customer and generating downstream messages to be sent to each customer

14   telling the customer which logical channel upon which the data said customer

15   requested will be found;.

16   (3) transmitting the requested iData and video program data and downstream

17   message data to one or more cherrypicker multiplexers; and

18   (4) in each cherrypicker multiplexer, adjusting the bandwidth of the video data

19   and/or the iData if necessary and repacketizing said video data and iData and

20   downstream message data in MPEG packets and transmitting said MPEG packets to

21   the customer who requested the data via an MPEG transport stream.

35. [currently amended]   A process carried out in a headend coupled to one or more video servers, said process for supplying video data and iData to consumerss, wherein iData is defined as data from one or more web or other servers other than said video servers coupled to said headend, comprising the steps of for:

        (1) in a modem coupled to one or more customers by any upstream data path and any downstream data path compatible with said modem, receiving upstream video-on-demand requests and requests for iData and iData commands and

transmitting them to a control computer, and receiving downstream iData and downstream command and control messages, both said <u>downstream</u> iData and said command and control messages encapsulated in TCP/IP or UDP/IP packets addressed to a host <u>computer</u> and <u>one or more</u> process<u>es running on said host computer</u> at a customer location, and transmitting said downstream iData and command and control messages to said customer to which it is addressed over said downstream data path;

(2) in said control computer transmitting one or more messages to one or more video servers, web servers and/or application servers that can supply the requested video data and iData requesting that they supply the requested video data and iData and assigning logical channels on which the requested video program data is to be transmitted to the customer and generating downstream command and control messages to be sent to each customer telling the customer which logical channel upon which the video-on-demand data said customer requested will be found;

(3) transmitting the requested video program data to one or more cherrypicker multiplexers; and

(4) in each cherrypicker multiplexer, adjusting the bandwidth of the video data of each video program if necessary to a smaller bandwidth and repacketizing said video data in MPEG packets and transmitting said MPEG packets to the customer who requested the data via an MPEG transport stream.

36. [currently amended] The process of claim 35 wherein said modem is a <u>Data Over Cable Service Interface Specifications (hereafter DOCSIS) compliant</u> ~~DOCSIS~~ cable modem and said upstream and downstream data paths are hybrid fiber coaxial cable plants.

1   37. [currently amended] The process of claim 35 wherein said modem <u>is</u> one or

2   more digital subscriber line modems, and said upstream and downstream data paths are

3   digital subscriber lines.

1   38. [currently amended] The process of claim 35 wherein said modem is <u>comprised</u>

2   <u>of</u> a conventional telephone line modem <u>receiver for receiving upstream data and commands</u>

3   <u>from a customer</u> and a <u>downstream circuit for delivery of data and commands downstream to</u>

4   <u>a customer using a satellite transmitting to a satellite antenna and satellite receiver at a</u>

5   <u>customer premises where said satellite antenna and satellite receiver at the customer</u>

6   <u>premises are not part of the invention, said downstream circuit of said modem comprising a</u>

7   satellite uplink transmitter <u>and a satellite transponder for transmitting said downstream data to</u>

8   <u>a satellite for transmission downstream to said customer via said satellite transponder,</u> and

9   wherein said upstream data path is a conventional POTS telephone line. and said

10   downstream data path is a satellite uplink, a satellite transponder and a satellite downlink

11   and satellite receiver at the customer site.

1   39. [currently amended] A process <u>carried out in a headend coupled to one or more</u>

2   <u>video servers, said process</u> for supplying video data to consumers, comprising the steps <u>of</u>

3   for:

4   (1) in a modem coupled to one or more customers by any upstream and any

5   downstream data path, receiving upstream video-on-demand requests and requests

6   for iData and iData commands and transmitting them to a control computer<u>, wherein</u>

7   <u>iData is defined as data from one or more web or other servers other than said video</u>

8   <u>servers coupled to said headend</u>, and receiving downstream command and control

9   messages from said control computer and transmitting them to customers over said

10   downstream data path via said modem;

11   (2) in said control computer transmitting one or more messages to one or

12   more video servers, web servers and/or application servers that can supply the

13   requested data requesting that they supply the requested video data and iData and

14   assigning logical channels on which the requested iData and video program data is

15   to be transmitted to the customer and generating downstream command and control

16   messages to be sent to each customer telling the customer which logical channel

17   upon which the iData and video program data said customer requested will be found;

18   (3) transmitting the requested iData and video program data to one or more

19   cherrypicker multiplexers; and

20   (4) in each cherrypicker multiplexer, adjusting the bandwidth of the video data

21   and/or the iData, if necessary, to a smaller bandwidth, and repacketizing said video

22   data and iData in MPEG packets and transmitting said MPEG packets to the one or

23   more customer who requested the data via one or more logical channels as one or

24   more MPEG transport streams.

1   40. [currently amended] The process of claim 39 wherein said modem is a Data Over

2   Cable Service Interface Specifications (hereafter DOCSIS) compliant ~~DOCSIS~~ cable modem

3   and said upstream and downstream data paths are hybrid fiber coaxial cable plants.

1   41. [currently amended] The process of claim 39 wherein said modem is one or more

2   digital subscriber line modems, and said upstream and downstream data paths are digital

3   subscriber lines.

1   42. [currently amended] The process of claim 39 wherein said modem is comprised

2   of a conventional telephone line modem receiver for receiving upstream data and commands

3   from a customer and a downstream circuit for delivery of data and commands downstream to

4   a customer using a satellite transmitting to a satellite antenna and satellite receiver at a

5   customer premises where said satellite antenna and satellite receiver at the customer

6   premises are not part of the invention, said downstream circuit of said modem comprising a

7   satellite uplink transmitter <u>and a satellite transponder for transmitting said downstream data to</u>

8   <u>a satellite for transmission downstream to said customer via said satellite transponder,</u> and

9   wherein said upstream data path is a conventional POTS telephone line~~, and said~~

10 ~~downstream data path is a satellite uplink, a satellite transponder and a satellite downlink~~

11 ~~and satellite receiver at the customer site~~.